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CANTOR COLBURN, LLP
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

EXAMINER	
PERRY, ANTHONY T	

ART UNIT	PAPER NUMBER
2879	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	10/783,253	KANNO ET AL.
	Examiner	Art Unit
	Anthony T. Perry	2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *2/20/04,2/23/06*.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 8, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Cok et al. (US 6,867,549).

Regarding claim 1, Cok et al. teach a color light emitting display device, comprising a plurality of emissive regions corresponding to a plurality of color components (color filters), wherein the plurality of emissive regions comprises: a plurality of emissive elements (OLEDs) each having an emissive element layer between two electrodes and which emit light of the same color (white), and a plurality of color-modifying elements (color filters) inherently provided at a side of the device closer to a side to be viewed than the emissive elements corresponding to at least some of the plurality of emissive elements, for emitting light having an emission spectrum which is at least partially different from an emission spectrum of incident light; the emission light from the plurality of emissive elements is viewed, in the emissive regions corresponding to the plurality of color-modifying elements (color filters), through the corresponding color-modifying elements; and areas of the plurality of emissive regions are directly proportional to ratios of modification efficiencies between luminance of light emitted from the color-modifying element and luminance of light incident on the color-modifying element among different color

components of the plurality of color components, and to luminance required for each color component necessary for white display (for example, see col. 5, lines 38-52).

Regarding claim 2, Cok et al. teach that the areas of the plurality of emissive regions are directly proportional to ratios among the color components between required luminance of the color components necessary for the white display and the luminance of light emitted from the color-modifying element (for example, see col. 5, lines 38-52).

Regarding claim 3, color filters filter incident light and allow transmission of light of specific wavelength bands.

Regarding claim 4, the modification efficiency of the color filters corresponds to a transmission efficiency of the color-modifying element.

Regarding claim 8, when a power is supplied with the same current density to the emissive elements provided in the plurality of emissive regions and light is emitted, a predetermined white display is achieved on a side to be viewed (for example, see col. 5, lines 38-52).

Regarding claim 9, the color-modifying elements (color filters) provided between the emissive element and the side of the display closer to the side to be viewed has emissive regions with a required color component (red, green, or blue) for the corresponding emissive regions which is different from the color component of the emission color (white) of the emissive element.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5-7 and 10-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cok et al. (US 6,867,549) in view of Eida et al. (US 6,137,459).

Regarding claims 5-6, as stated in the rejection of claim 1, above, Cok et al. teaches using a color filter as the color-modifying element, which filters the white incident light and allows transmission of light of a specific wavelength band. Cok et al. does not specifically state that a color-modifying element changes the incident light into light of a different wavelength and emits the changed light.

However, Eida teaches that in using color filters as the color-modifying elements, light loss is great because of the function of the color filters through which the color of light is separated or cut. For example, where the color of white light emitted is separated into three primary colors (red, green, blue) through color filters, the white luminance is reduced to at most 1/3. Eida teaches that by using color-changing layers of phosphors, the layers have the function of absorbing light to change it into longer wavelength fluorescence with smaller energy. For example, if phosphors having a degree of light absorption of 80% emit fluorescence at a yield of 80%, they can change light into longer wavelength light at a yield of 64%, and that phosphors of that type are well known (for example, see col. 1, line 62 – col. 2, line 9). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use

phosphors as the color-modifying element, instead of color filters, so as to be able to more efficiently utilize the light emitted from the emissive element. One of ordinary skill in the art would have known how to substitute the color filters of the Cok reference with phosphors of the Eida reference (i.e., the modification efficiency would relate to the color changing efficiency of the phosphor instead of the transmission efficiency of the color filters).

Regarding claim 7, Eida teaches that the color-modifying element includes a phosphor layer, which changes the incident light into light of a different wavelength, and an insulating layer for absorbing UV light that inherently filters a portion of the changed light, and allows transmission of light of a specific wavelength band (for example, see col.12, lines 20-31).

Regarding claims 10, 12, 14, 15, and 17, Cok et al. teach a color light emitting display device, comprising a plurality of emissive regions corresponding to a plurality of color components (color filters), wherein the plurality of emissive regions comprises: a plurality of emissive elements (OLEDs) each having an emissive element layer between two electrodes and which emit light of the same color (white), and a plurality of color-modifying elements (color filters) inherently provided at a side of the device closer to a side to be viewed than the emissive elements corresponding to at least some of the plurality of emissive elements, for emitting light having an emission spectrum which is at least partially different from an emission spectrum of incident light; the emission light from the plurality of emissive elements is viewed, in the emissive regions corresponding to the plurality of color-modifying elements (color filters), through the corresponding color-modifying elements; and areas of the plurality of emissive regions are directly proportional to ratios of modification efficiencies between luminance of light emitted from the color-modifying element and luminance of light incident on the color-

modifying element among different color components of the plurality of color components, and to luminance required for each color component necessary for white display (for example, see col. 5, lines 38-52). Cok et al. does not specifically state that a color-modifying element changes the incident light into light of a different wavelength and emits the changed light.

However, Eida teaches that in using color filters as the color-modifying elements, light loss is great because of the function of the color filters through which the color of light is separated or cut. For example, where the color of white light emitted is separated into three primary colors (red, green, blue) through color filters, the white luminance is reduced to at most 1/3. Eida teaches that by using color-changing layers of phosphors, the layers have the function of absorbing light to change it into longer wavelength fluorescence with smaller energy. For example, if phosphors having a degree of light absorption of 80% emit fluorescence at a yield of 80%, they can change light into longer wavelength light at a yield of 64%, and that phosphors of that type are well known (for example, see col. 1, line 62 – col. 2, line 9). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use phosphors (for example, a phosphor emitting red light and a phosphor emitting green light) as the color-modifying element, instead of color filters, so as to be able to more efficiently utilize the light emitted from the emissive element. One of ordinary skill in the art would have known how to substitute the color filters of the Cok reference with phosphors of the Eida reference (i.e., the modification efficiency would relate to the color changing efficiency of the phosphor instead of the transmission efficiency of the color filters). Eida teaches that the color-modifying element includes a phosphor layer, which changes the incident light into light of a different wavelength, and at least one optical function layer for absorbing UV light that inherently filters a portion of

the changed light, and allows transmission of light of a specific wavelength band (for example, see col.12, lines 20-31).

Regarding claim 11, in the combined invention one of ordinary skill in the art would realize to have the areas of the plurality of emissive regions directly proportional to a ratio, between luminance of light emitted through the color-modifying element, including the phosphor and the at least one optical function layer, and the luminance required for each color component necessary for white display.

Regarding claim 13, in the combined invention, one of ordinary skill in the art would realize that the modification efficiency of the color-modifying element would include the transmission efficiency of the optical function layer of the color-modifying element.

Regarding claim 16, Cok teaches that it is desired that when a power is supplied with the same current density to the emissive elements provided in the plurality of emissive regions and light is emitted, a predetermined white display is achieved on a side to be viewed (for example, see col. 5, lines 38-52).

Regarding claim 18, Eida teaches that the at least one layer which absorbs at least a portion of the incident light (UV absorbing layer) includes an insulating layer which is formed between the emissive element and a side of the device in which display is viewed (for example, see col. 12, lines 20-31).

Regarding claim 19, Cok et al. teaches a color display device having a first emissive region and a second emissive region associated with different color components (color filters), the color display device comprising: a plurality of emissive elements (OLEDs) each having an emissive element layer between two electrodes and which emit light of the same color (white),

and a first color-modifying element (for example, a red color filter) and a second modifying element (for example, a blue color filter) inherently provided on a side of the device closer to a side to be viewed than the emissive element and corresponding to at least some of the plurality of emissive elements (OLEDs), for transmitting a light having a specific wavelength (color), the first and second color-modifying element transmitting light of different colors, wherein in the first emissive region, emission light from the emissive element is viewed through the first color-modifying element; in the second emissive region, emission light from the emissive element is viewed through the second color-modifying element; a modification efficiency corresponding to a ratio of transmitted through the first color-modifying element with respect to light incident on the first color-modifying element is higher than a modification efficiency corresponding to a ratio of light transmitted through the second color-modifying element with respect to light incident on the second color-modifying element, and an area of the first emissive region is smaller than an area of the second emissive region (for example, see col. 5, lines 38-52). Cok et al. does not specifically state that the color-modifying elements emit light of a different emission spectrum than the incident light.

However, Eida teaches that in using color filters as the color-modifying elements, light loss is great because of the function of the color filters through which the color of light is separated or cut. For example, where the color of white light emitted is separated into three primary colors (red, green, blue) through color filters, the white luminance is reduced to at most 1/3. Eida teaches that by using color-changing layers of phosphors, the layers have the function of absorbing incident light to change it into longer wavelength fluorescence with smaller energy. For example, if phosphors having a degree of light absorption of 80% emit fluorescence at a

yield of 80%, they can change light into longer wavelength light at a yield of 64%, and that phosphors of that type are well known (for example, see col. 1, line 62 – col. 2, line 9). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use phosphors (for example, a phosphor emitting red light and a phosphor emitting green light) as the color-modifying element, instead of color filters, so as to be able to more efficiently utilize the light emitted from the emissive element. One of ordinary skill in the art would have known how to substitute the color filters of the Cok reference with phosphors of the Eida reference (i.e., the modification efficiency would relate to the color changing efficiency of the phosphor instead of the transmission efficiency of the color filters and when the modification efficiency corresponding to a ratio of light emitted from the first color-modifying element with respect to light incident on the first color-modifying element is higher than a modification efficiency corresponding to a ratio of light emitted from the second color-modifying element with respect to light incident on the second color-modifying element, would make the area of the first emissive region smaller than the area of the second emissive region).

Regarding claim 20, in the combined invention the ratio between the areas of the first emissive region and the second emissive region corresponds to a ratio between: a luminance, required for white color display, of the color component corresponding to the first emissive region with respect to a luminance of the light emitted from the first color-modifying element; and a luminance, required for white color display, of the color component corresponding to the second emissive region with respect to a luminance of the light emitted from the second color-modifying element.

Regarding claim 21, Cok et al. teach a color light emitting display device, comprising a plurality of emissive regions corresponding to a plurality of color components (color filters), wherein the plurality of emissive regions comprises: a plurality of emissive elements (OLEDs) each having an emissive element layer between two electrodes and which emit light of the same color (white), and a plurality of color-modifying elements (color filters) inherently provided at a side of the device closer to a side to be viewed than the emissive elements corresponding to at least some of the plurality of emissive elements, for emitting light having an emission spectrum which is at least partially different from an emission spectrum of incident light; the emission light from the plurality of emissive elements is viewed, in the emissive regions corresponding to the plurality of color-modifying elements (color filters), through the corresponding color-modifying elements; and areas of the plurality of emissive regions are directly proportional to ratios of modification efficiencies between luminance of light emitted from the color-modifying element and luminance of light incident on the color-modifying element among different color components of the plurality of color components, and to luminance required for each color component necessary for white display (for example, see col. 5, lines 38-52). Cok et al. does not specifically state that a color-modifying element changes the incident light into light of a different wavelength and emits the changed light.

However, Eida teaches that in using color filters as the color-modifying elements, light loss is great because of the function of the color filters through which the color of light is separated or cut. For example, where the color of white light emitted is separated into three primary colors (red, green, blue) through color filters, the white luminance is reduced to at most 1/3. Eida teaches that by using color-changing layers of phosphors, the layers have the function

of absorbing light to change it into longer wavelength fluorescence with smaller energy. For example, if phosphors having a degree of light absorption of 80% emit fluorescence at a yield of 80%, they can change light into longer wavelength light at a yield of 64%, and that phosphors (for example, a phosphor that emits red light and a phosphor that emits green light) of that type are well known (for example, see col. 1, line 62 – col. 2, line 9). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use phosphors (for example, a phosphor emitting red light and a phosphor emitting green light) as the color-modifying element, instead of color filters, so as to be able to more efficiently utilize the light emitted from the emissive element. One of ordinary skill in the art would have known how to substitute the color filters of the Cok reference with phosphors of the Eida reference (i.e., the modification efficiency would relate to the color changing efficiency of the phosphor instead of the transmission efficiency of the color filters). Eida teaches that the color-modifying element includes a phosphor layer, which changes the incident light into light of a different wavelength, and at least one optical function layer for absorbing UV light that inherently filters a portion of the changed light, and allows transmission of light of a specific wavelength band (for example, see col.12, lines 20-31).

Cok discloses equations for determining the relative sizes of different colored light emitting elements (for example, see col. 3, line 34 – col. 4, line 56). Cok states that the equations could easily be modified to incorporate the use of different-colored color filters in conjunction with same-colored light emitting elements (col. 5, lines 38-52). Likewise, it would have been obvious to one of ordinary skill in the art at the time the invention was made to take into consideration the luminance of incident light to the first and second color-modifying

elements, the transmission efficiencies of the first and second color-modifying elements, and luminance of a first color component required in the first emissive region and luminance of a second color component required in the second emissive region for realizing a predetermined color by addition of colors, when deducing an equation for determining appropriate size of the different color elements of the combined invention. Naturally, the condition, $S_1:S_2 = a_1/(L_1*TE_1):a_2/(L2*TE_2)$ would obviously be satisfied.

Regarding claims 22-23, see rejection of claim 21, above. Cok goes on to explain an equation that includes a variable that accounts for the lifetime of the different color emitting elements (see col. 4, line 57 – col. 5, line 37). Likewise, it would have been obvious to one of ordinary skill in the art at the time the invention was made to take into consideration the lifetime of the two phosphor layers (the luminance half-life, which is well known in the art of phosphors, of the two color components in the respective emissive regions), when deducing an equation for determining appropriate size of the different color elements of the combined invention. Naturally, the condition, $S_1:S_2 = a_1/(L_1*TE_1* T_1):a_2/(L2*TE_2* T_2)$ would obviously be satisfied.

Regarding claim 24, it is well known in the art to perform an aging treatment to phosphors so that their respective luminance half-lives become more stable (the rate of degradation of emission luminance of the phosphors becomes constant) so that the lifetime of displays using such phosphors is prolonged. Accordingly, it would have been obvious to one of ordinary skill in the art to perform an again treatment to the phosphors of the color components so that their emission luminance is constant, so as to provide a display with an increased lifetime.

Regarding claim 25, Cok et al. teach a color light emitting display device, comprising a plurality of emissive regions corresponding to a plurality of color components (color filters),

wherein the plurality of emissive regions comprises: a plurality of emissive elements (OLEDs) each having an emissive element layer between two electrodes and which emit light of the same color (white), and a plurality of color-modifying elements (color filters) inherently provided at a side of the device closer to a side to be viewed than the emissive elements corresponding to at least some of the plurality of emissive elements, for emitting light having an emission spectrum which is at least partially different from an emission spectrum of incident light; the emission light from the plurality of emissive elements is viewed, in the emissive regions corresponding to the plurality of color-modifying elements (color filters), through the corresponding color-modifying elements; and areas of the plurality of emissive regions are directly proportional to ratios of modification efficiencies between luminance of light emitted from the color-modifying element and luminance of light incident on the color-modifying element among different color components of the plurality of color components, and to luminance required for each color component necessary for white display (for example, see col. 5, lines 38-52). Cok et al. does not specifically state that a color-modifying element changes the incident light into light of a different wavelength and emits the changed light.

However, Eida teaches that in using color filters as the color-modifying elements, light loss is great because of the function of the color filters through which the color of light is separated or cut. For example, where the color of white light emitted is separated into three primary colors (red, green, blue) through color filters, the white luminance is reduced to at most 1/3. Eida teaches that by using color-changing layers of phosphors, the layers have the function of absorbing light to change it into longer wavelength fluorescence with smaller energy. For example, if phosphors having a degree of light absorption of 80% emit fluorescence at a yield of

80%, they can change light into longer wavelength light at a yield of 64%, and that phosphors of that type are well known (for example, see col. 1, line 62 – col. 2, line 9). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use phosphors (for example, a phosphor emitting red light and a phosphor emitting green light) as the color-modifying element, instead of color filters, so as to be able to more efficiently utilize the light emitted from the emissive element. One of ordinary skill in the art would have known how to substitute the color filters of the Cok reference with phosphors of the Eida reference (i.e., the areas of the plurality of emissive regions correspond to the ratios of modification efficiencies corresponding to luminance of incident light and luminance of emitted light in the color modifying element among different color components (for example red phosphors and green phosphors), and to luminance required for each color component necessary for realizing a predetermined color (white) represented by addition of colors). Eida teaches that the color-modifying element includes a phosphor layer, which changes the incident light into light of a different wavelength, and at least one optical function layer for absorbing UV light that inherently filters a portion of the changed light, and allows transmission of light of a specific wavelength band (for example, see col.12, lines 20-31).

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Arnold et al. (US 6,747,618), Cok (6,903,378), Cok (6,987,355), Roitman et al. (US 6,137,221), and Koyam (US 6,617,799) teach similar features.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Anthony Perry* whose telephone number is **(571) 272-2459**. The examiner can normally be reached between the hours of 9:00AM to 5:30PM Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-2457. **The fax phone number for this Group is (571) 273-8300.**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JOSEPH WILLIAMS
PRIMARY EXAMINER

Anthony Perry
Patent Examiner
Art Unit 2879
October 1, 2006